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Hydrogen, What's Next?

U.S. National Outreach and Hydrogen Standards Development

By Juana Williams

Upcoming Workshops

NIST WMD is planning two 2 ½-day workshops on "Commercial Hydrogen Measurement Standards" at its Gaithersburg, Maryland campus. The workshops are made possible through funding from the American Competitiveness Initiative. The funding will also cover the costs for a limited number of weights and measures officials to participate in the workshops. The workshops will familiarize weights and measures officials, who are responsible for field inspection and test of motor-fuel dispensers, with the latest developments in the operation, performance, and safety of hydrogen refueling equipment and related transportation technologies. Workshop participants will have the opportunity to tour hydrogen vehicles, observe vehicle refueling, and talk to experts on hydrogen technology and safety .

Mark your calendars and let NIST WMD know about your interest in attending workshops on the following dates:

- August 12 - 14, 2008
- September 23 - 25, 2008

Registration forms will be made available shortly through the NIST Weights and Measures Division list server and through the WMD main office. If you have questions or are interested in participating in a workshop please contact Juana Williams by email at juana.williams@nist.gov or telephone at 301-975-3989.

New Hydrogen Web Page

In July 2008, NIST WMD plans to launch a link from its home page to a new web page titled "Developing Commercial Hydrogen Measurement Standards." The web page will be the U.S. weights and measures and hydrogen communities' source for the latest information and status of ongoing work to develop uniform and appropriate legal metrology standards for commercial hydrogen measurements. The web page will include the following topics:

(1) *U.S. National Work Group (USNWG) for the Development of Commercial Hydrogen Measurement Standards* and its work to promote, encourage, and participate in the establishment of a comprehensive set of legal metrology standards for commercial measurement of hydrogen for vehicle and other refueling applications. This section will provide updates on the USNWG work on (1) device design, accuracy, installation, and use requirements; (2) method of sale requirements; (3) test procedures; and (4) fuel quality standards. The web page will also include the USNWG meeting agendas and summaries.

(2) *Development of International Standards* which address commercial hydrogen measurement. This section will report on the status of NIST WMD's work to consider and promote the interest of all U.S. stakeholders as it attempts to avoid conflicts with related hydrogen standards developed by international standards and codes developing organizations.

(3) *NIST WMD Five Year Plan* to carry out its mission to promote uniformity in hydrogen standards and technology development, for weights and measures requirements and procedures, to: (1) ensure the accuracy of commercial hydrogen measurements; (2) enhance consumer protection; (3) foster fair competition; and (4) facilitate economic growth and trade both nationally and internationally in support of the hydrogen economy.

(4) *Quarterly Articles on Hydrogen News* includes a list of links to the hydrogen related articles that NIST WMD publishes and makes available for the reader's convenience at:

http://ts.nist.gov/WeightsAndMeasures/newsletterarchive.cfm.

(5) *Helpful Hydrogen Links* provide some basic information on hydrogen refueling sites, safety, and production. This section will be updated as the work expands to meet the needs and requests of readers.

(6) *Current Hydrogen Events* taking place that are of interest to readers such as the June 17-19, 2008 USNWG Subcommittee Meetings on Hydrogen Device Standards and Test Procedures and Hydrogen Fuel Quality Specifications being held at the Gas Technology Institute, Des Plaines, IL as the newsletter goes to publication.

(7) *Contacts in the NIST WMD for Commercial Hydrogen Measurement* and related legal metrology issues.

Please contact Juana Williams by e-mail at juana.williams@nist.gov or by telephone at 301-975-3989, if you have questions about the upcoming hydrogen web page.

Specifications, Tolerances, Calibrations, OH MY!

Device Just Calibrated – Acceptance Tolerances Apply, Right?

By Rick Harshman

Which NIST Handbook 44 (*Specifications, Tolerances, and Other Technical Requirements for Weighing Devices)* tolerances (acceptance or maintenance) would apply if you were testing a commercial weighing or measuring device that had been in service more than 30 days, that was not under official rejection for failing to conform to performance requirements, and for which the device owner acknowledged that a service agency had just calibrated the device the week before? Would your answer to this question be any different if you learned that the service agency had calibrated the device within the last 24 hours? How about just prior to your arrival? You might be surprised to learn that not only is the answer the same in each of these instances – but also that the correct answer is "maintenance tolerances." Now consider another scenario. What if the official test was being conducted by a service agency (i.e., you were present only to witness the official test and take action based upon the results of the service agency's test) and during the course of the test, the service technician performing the test elected to make an adjustment to bring the performance errors closer to zero value. With the understanding that a complete retest would then be needed, might this affect which tolerances would apply to the results of that retest? WMD frequently receives inquiries relative to the proper application of tolerances as they relate to equipment that has recently undergone adjustment. This article will outline a few of the more common scenarios and explain which tolerances apply to them and why.

Tolerances that apply to recently calibrated devices being tested by field officials

While it may seem logical that acceptance tolerances would apply to all devices being officially tested immediately following completion of accuracy adjustments (or perhaps even within 30 days of completion of accuracy adjustments), this is not the case. NIST Handbook 44 (HB-44) paragraphs G-T.1. and G-T.2. specify the conditions in which acceptance and maintenance tolerances are to be applied. According to paragraph G-T.1., the only time the more stringent acceptance tolerances would apply to a device that had been in service for more than 30 days would be if that device were being tested within 30 days following corrective service after being officially rejected for failure to perform to performance requirements or within 30 days after major reconditioning or overhaul. Paragraph G-T.2 specifies that maintenance toler-

ances apply to equipment in actual use, except as provided in G-T.1. Thus, maintenance tolerances apply in cases where:

- officials are conducting performance tests on devices that have been in service for more than 30 days, and
- those devices are not being officially tested for the first time within 30 days of corrective service following official rejection for failing to perform to performance requirements.

This is true regardless of when the performance of those devices was last adjusted.

G-T.1. Acceptance Tolerances. - Acceptance tolerances shall apply to:

(a) equipment to be put into commercial use for the first time;
(b) equipment that has been placed in commercial service within the preceding 30 days and is being officially tested for the first time;
(c) equipment that has been returned to commercial service following official rejection for failure to conform to performance requirements and is being officially tested for the first time within 30 days after corrective service;
(d) equipment that is being officially tested for the first time within 30 days after major reconditioning or overhaul; and
(e) equipment undergoing type evaluation.
(Amended 1989)

G-T.2. Maintenance Tolerances. - Maintenance tolerances shall apply to equipment in actual use, except as provided in G-T.1.

There are those who sometimes take the position that acceptance tolerances should be applied to such "already in-service" and "recently calibrated" devices. To support their position, they are often quick to point out that when equipment is adjusted; those making the adjustments must bring performance errors as close as practical to zero value as required by HB-44 paragraph G-UR.4.3. They justify the application of acceptance tolerances to such devices by concluding that these devices are required to be calibrated to within at least acceptance tolerances in order to satisfy this requirement.

G-UR.4.3. Use of Adjustments. - Weighing elements and measuring elements that are adjustable shall be adjusted only to correct those conditions that such elements are designed to control, and shall not be adjusted to compensate for defective or abnormal installation or accessories or for badly worn or otherwise defective parts of the assembly. Any faulty installation conditions shall be corrected, and any defective parts shall be renewed or suitably repaired, before adjustments are undertaken. Whenever equipment is adjusted, the adjustments shall be so made as to bring performance errors as close as practicable to zero value.

While it may often be true that the same adjustments which bring performance errors as close as practical to zero value also cause some devices to perform to within acceptance tolerances, this is not always the case, nor was this the intent of paragraph G-UR.4.3. To prove this point, consider a device with mechanical weighing or measuring elements (e.g., liquid meters, scale levers, etc.). While in relatively new condition, minor adjustments and periodic maintenance may be all that's needed to maintain accuracy to within acceptance tolerances. However, as time passes and mechanical parts (e.g., seals, pivots, bearings, etc.) wear from regular use, this higher level of accuracy may no longer be achievable simply by making minor adjustments and performing regular maintenance. At some point in time, parts will become worn to the extent that performance errors cannot be adjusted to within acceptance tolerances, yet the device can still be adjusted and accuracy maintained to within maintenance tolerances. Once in this condition, the device is still considered suitable for commercial use and it would not be appropriate to require it be adjusted to within acceptance tolerances. Doing so would create an unnecessary financial burden on the device owner because to achieve the higher level of accuracy, parts would most likely need to be replaced or the device overhauled. This example demonstrates why two sets of tolerances were established in HB-44. Acceptance tolerances were intended to apply to new and recently reconditioned equipment and to equipment that is retested within 30 days of corrective service after being officially rejected for failure to conform to performance requirements. Maintenance tolerances include a limited allowance for the effects of normal wear on the accuracy of a device that is properly selected, installed, used, and maintained while still ensuring an acceptable degree of accuracy for commercial service. Thus, two sets of tolerances were established to minimize the cost of adjustment, recalibration, repair, and replacement to the owner of a commercial device.

Tolerances that apply to recently calibrated devices being officially tested by service agencies (witnessed by field officials)

So are the rules of applying tolerances any different when the official test of a device is being conducted by a service agency and only witnessed by an official? In some jurisdictions, service agencies conduct official tests on certain types of devices while officials in those jurisdictions often witness those tests and take action based upon their results. In some cases, the weights and measures jurisdiction may not have adequate equipment to conduct a complete test on certain kinds of devices and must rely on the service agency to provide the necessary equipment and perform the official test. Service personnel may voluntarily contact the weights and measures jurisdiction to arrange for an official to witness their test, which may be part of a regular maintenance agreement that the service agency has negotiated with the device owner.

With respect to the application of tolerances, the rules are the same regardless of whether a service agency or an official is performing the official test. However, if the service agency's test of a device is to be considered an official test, i.e., one in

which the official witnessing and directing the test will either certify (by approval) or reject the device based upon the results of test, the official should apply the appropriate tolerances outlined in either paragraphs G-T.1. or G-T.2. as if he were conducting the test. In addition, the official witnessing the test must make certain that at least the minimum test procedures outlined in the NIST Examination Procedure Outline (EPO) applicable to that device type have been completed. Otherwise, the test should not be considered an official test and no action should be taken on the results of test by the official. Note that if no EPO has been developed for the type of device being tested, a minimum official test must include all of the procedures listed in the notes section of the particular HB-44 device code applicable to the device being tested.

When adjustments are made to correct an out-of-tolerance condition

If the service agency's test is considered an official test, there are only two possible outcomes regarding device performance. Either the device performs to within tolerances or it doesn't. If the results of the service agency's initial test exceed maintenance tolerances (for devices that have been in service for more than 30 days and are not currently under official rejection for failing to conform to performance requirements and being retested within 30 days after corrective service), the official witnessing the test should immediately consider and record that the device is rejected. To alleviate any misunderstandings, officials should, upon witnessing tolerances being exceeded during the test, make the service agency aware of the rejected status of the device and point out that any adjustments made must now bring performance errors as close as practicable to zero value and return accuracy to within at least acceptance tolerances. Since corrective service will need to be performed, acceptance tolerances apply to any retest performed within 30 days of that service.

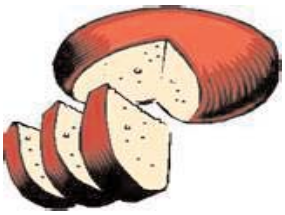
When adjustments are made to bring "in-tolerance" results as close to zero error as practicable

However, if the results of the initial test are within maintenance tolerances, the device should be considered approved (providing it conforms to all other HB-44 requirements), yet, it is this scenario where officials are encouraged to exercise caution. Because the service agency's test of a device often serves two purposes, one purpose being part of the maintenance agreement the service agency has negotiated with the device owner, and the other purpose being the official test of the device, technicians will often want to make an adjustment to return performance errors as close as practicable to zero value. If adjustments are made, a complete retest of the device must be performed before it can be approved. However, because the device was never in a rejected status, maintenance tolerances would still apply to the results of the retest even though the performance of the device had just been adjusted. Be aware that whenever a technician makes an adjustment, they are required to adjust as specified in paragraph G-UR. 4.3. Use of Adjustments.

In conclusion, the rules for applying maintenance and acceptance tolerances are the same regardless of whom (an official or service agency) is performing the official test on a commercial weighing or measuring device. It's important that service personnel and officials witnessing tests conducted by service personnel understand and agree on the significance of the tests that are performed. Officials, whether conducting the test themselves or witnessing others conducting tests, must only take action on official tests, i.e., complete tests conducted in accordance with NIST EPO's and HB-44. For more information regarding the application of HB-44 tolerances, contact Rick Harshman at 301-975-8107 or by email at richard.harshman@nist.gov.

SAFETY ALERT . . . . SAFETY ALERT

See the Safety Alert from the National Propane Gas Association on page 11.



Is the Wax Coating on Cheese Considered Tare?

By David Sefcik

Recently, the NIST Weights and Measures Division (WMD) has received calls from several state weights and measures jurisdictions asking about the wax coating on a variety of of cheeses. Should the wax coatings be considered as tare weight or net weight? Definitely a good question!

Some may argue that although the wax is not consumed, it may be an integral part of the manufacturing of the cheese and there are cases where cheese that is sold wholesale, by weight, has included the weight of the wax.

The issue of wax on cheese came up in 1984, and the WMD asked the Food and Drug Administration (FDA) for guidance. In a letter dated March 20, 1984, the FDA Associate Director for Compliance provided the following interpretation:

> We are of the opinion that 21 CFR 101.105(g) requires that wax coatings on cheese always be considered part of the tare. This section states that the declaration of quantity of contents shall accurately reveal the quantity of food in the package exclusive of wrappers and other material packed therewith.
>
> Even when the wax is an integral part of the manufacture of the cheese, the wax itself is not derived from

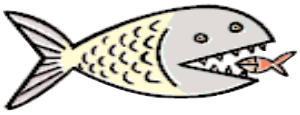
the curd of any type of milk. As a result, it would be inappropriate to consider the wax to be part of the food known as cheese.

Also, most consumers would consider such wax inedible and would discard it. Under these circumstances, we believe that consumers would be misled by declarations of net weight including the wax coating.

Further, you should be aware that our position on these wax coatings applies to wholesale as well as retail cheese packages. Both types of packages could be considered misbranded if the net weight declaration included the wax coating.

Clearly, wax on cheese is to be considered tare! This interpretation still holds true today.

To obtain a copy of this letter, please visit our website at http://www.nist.gov/owm. Go to the Quick List of Popular Links and select "Handbook 133, Checking Net Contents" and scroll down to the "Handbook 133 Resources" table to select the letter and this article.



Scales

Overcoming Roadblocks of Testing Large Capacity Scales

By John Barton

Large amounts of product in bulk form and individual products of considerable mass require the use of scales with large capacities to facilitate transactions where these products must be quantified in terms of weight. Proper testing of these devices can be influenced by a number of factors, but perhaps none more so than the characteristics of their design and installation. NIST Handbook 44, *Specifications, Tolerances, and Other Technical Requirements for Weighing Devices,* includes several important requirements which are available to scale inspectors whose duties routinely involve difficulties encountered when testing these large capacity scales.

Certain categories of large capacity scales are generally tested without a great deal of difficulty; two that come immediately to mind are vehicle scales and railroad track scales. Performing a proper test of most vehicle-type scales encountered normally presents only minor complications, if any at all. These scale installations generally provide relatively easy access to the weighing element(s) for testing and inspection purposes, as they are designed to accommodate large vehicles which handle the products that are weighed on this type of scale. The load receiving element most often consists of a large, flat surface with little or no obstructions. Mechanized test equipment and an adequate supply of weight standards are commonly available. Railroad track scales normally consist of a narrow section of rail track that makes up the weighing element, and the scales are configured for considerable capacities (commonly 200,000 lb to 500,000 lb). This type of configuration can eliminate the ability of many agencies to provide an official test. This being the case, testing of these railroad track scales are performed by only a limited and exclusive group of agencies having the proper equipment and the availability of sufficient test weights. In many instances these agencies are contracted to furnish test equipment and services, thereby eliminating the burden to regulatory officials of performing the test themselves.

Other categories of large capacity scales do present routine difficulties due to the nature of their design and their prolific utilization. Unfortunately, for the scale inspector, there are many products which are handled in a more efficient manner by the use of scales that are more specialized in their design and construction. These scales are better suited to meet the owner's needs; however, they often involve obstacles that must be circumvented when performing a safe and comprehensive evaluation of their performance.

NIST Handbook 44 provides the inspector with requirements (primarily User Requirements) that place the responsibility of removing the barriers to effective and efficient test procedures on the scale owner and installation technician. Within Handbook 44 there are requirements which address access to weighing elements. For example, Section 2.20, paragraph UR.2.5. - Access to Weighing Elements; and Section 1.10, paragraph G-UR.2.3. - Accessibility for Inspection, Testing, and Sealing Purposes, both convey the need for proper installation of scale components which facilitate the inspection of devices. The requirements of construction and installation, when enforced, will assist the inspector and technician in performing their duties with minimal obstruction. This is also recognized and addressed in requirements such as Section 2.20; paragraph UR.2.9 - Provision for Testing Dynamic Monorail Weighing Systems, and Section 2.20, paragraph UR.2.6. - Approaches. There are applicable requirements that specifically address the responsibility of the owner or operator such as Section G-UR.4.4. – Assistance in Testing Operations. Requirements such as these are often used to facilitate the task of proper scale testing and inspection. However, it should be acknowledged that the resources available and the motivation of owners and operators to supply any necessary assistance can be limited.

NIST Handbook 44 Section 2.20, paragraph N.3., and Table 4 also dictate the minimum test weight and test loads necessary for an official test. Unfortunately, these requirements do not typically require the manufacturer of these large capacity devices to include provisions to properly position test weights on the weighing elements. Scales used to weigh a particular type of product and those built with a specific function within

a process are not often designed with the inspection and testing process in mind.

Many regulatory departments, facing a lack of resources, will require each inspector to be proficient in the inspection of all weighing and measuring devices encountered in the field rather than training employees as specialists in different categories of device inspection. This being the case, it may be beyond the scope and ability of many agencies to equip every employee with a full complement of various standards, and the minimum amount of standards needed to perform an official test on these larger capacity scales.

Provided that sufficient standards are available, the amount and the denomination of the test weights used may necessitate the use of mechanical means to apply the standards to the weighing element. The use of mechanized means to position large test weights during a test provides an alternative to the labor intensive manual methods, although the machinery used to move the weights is not always maneuverable enough to navigate tight spots or close quarters. Personal experience has made it clear to me that design engineers, manufacturers, and installers of large capacity scales have given little thought to the inspection process, which will continue long after the initial set-up of these devices. Livestock scales are installed with the focus being on maintaining control of the animals through the gates, stalls, and the show rings rather than with transporting test equipment and standards to and from the scales. In similar fashion, most above ground hopper-type scale installations are obviously constructed and installed with little regard for the scale inspector's method of testing. The use of machinery to move large test weights on to and off of these large capacity scales may also be restricted due to the location of the scale in a hazardous or a sanitary environment. The need for the use of special equipment also makes it more unlikely that a regulatory official will be prepared to perform an on-the-spot inspection without prior arrangements being made. The performance of unannounced inspections is a core principle in many jurisdictions and a tool used to enforce the laws and requirements the agency is mandated to carry out.

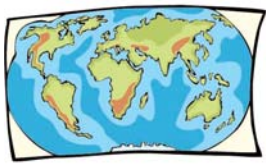
Capacities of 5,000 – 20,000 lb are common with crane, hopper, monorail, and animal scales, and they are most often manufactured with larger capacities and smaller load receiving elements. The inspector is then faced with the task of transporting the standards to the scale. The proper distribution of test weight on the weighing element is critical to obtain valid test results, and the inspector must take care to avoid any situation where off-center loading can occur. Errors resulting from unequal pressure placed on the load bearing points can produce skewed results and serve to invalidate an official test. These devices are constructed to perform accurately when used as designed and, therefore, should be tested using test loads applied to the device in a manner that reproduces the application of force (with regards to stress points and direction of loading) when in use.

Many times innovation is called for when placing standards of sufficient amount and denomination onto the scale. Very few installations are identical, and each situation may have its own peculiarities. Chains, slings, cables, and custom-made riggings may be needed for proper testing, and the use of these must be done in ways that avoid binding, twisting, or any type of interference with the live portions of the scale. It must be understood that the use of these items also adds weight to the device which must be accounted for (consideration of dead load and initial zero setting) during testing. Custom-made devices are, in many instances, expensive, given the specialized nature of their construction, and are possibly used only during a small number of actual tests, thereby calling into question the practicality of investing in such an item. In addition, the use of these means must always precipitate concern for personal safety and for possible damage of the scale itself. Substitution, strain, and materials testing are methods which provide the inspector with alternatives.

Materials testing uses product commonly weighed during normal use of the scale as a test load. This material is weighed elsewhere either prior to or after being weighed on the scale under evaluation (hopefully within a short time frame so as to minimize any change to either the material's weight or the scale's performance). Therefore, this method relies on the availability of a certified reference scale which may or may not be in the vicinity. Due to the nature of the procedure involved and the involvement of uncontrolled variables, this type of testing may not always prove to be a viable alternative.

Both substitution and strain tests make use of material or items typically weighed on the scale to apply a load to the scale in order to occupy or "use up" part of the capacity of the device. Material and error weights take the place of a known quantity when performing a substitution test, while strain testing uses material as an unknown quantity. With this portion of the weighing capacity being occupied, additional test weight may be applied to test the response of the scale within the upper range of the device.

Large capacity devices such as those described in this article are in use much more so than may be readily apparent, and the effect they may have on day-to-day transactions should not be underestimated. Those involved with the design and installation of these devices should be strongly encouraged to ensure that the devices will comply with all applicable requirements in NIST Handbook 44 including installation, use, and test requirements, and to consider the obstacles which must be overcome when verifying the scale's accuracy after installation. It is not the intent of this article to propose a universal remedy to the difficulties encountered when testing the types of scales mentioned, but rather to note the impediments involved in testing these devices. In addition, it is necessary to acknowledge the efforts of those whose routine duties require the use of technical ingenuity along with physical skills to perform these critical evaluations.



International Legal Metrology

International Legal Metrology Organizational Primer

By S. Wayne Stiefel

1. Measurement

1.1 The International Bureau of Weights and Measures

The International Bureau of Weights and Measures, formally known by its French name, Bureau International des Poids et Measures (BIPM) in Paris, is responsible for the definition of the International System of Units (SI) and promoting worldwide consistency of physical measurements. It is the institute that coordinates many international metrology activities, and performs metrology research. The BIPM operates under the supervision of the International Committee for Weights and Measures (CIPM). The CIPM suggests modifications to the SI to the General Conference on Weights and Measures (CGPM) for formal adoption. The CGPM is the primary intergovernmental treaty organization[1] responsible for the SI, representing nearly 50 countries. Both the BIPM and the CIPM were established by the Meter Convention, which was signed in Paris in 1875 by representatives of seventeen nations, including the United States. Refinement of the SI is an ongoing process aided by the work of BIPM's Consultative Committees: Electricity and Magnetism, Photometry and Radiometry, Thermometry, Length, Time and Frequency, Units, Mass and related quantities, and Amount of substance.

1.2 National Metrology Institutes

Within countries, measurements are made consistent/comparable through traceability to their primary standards maintained by the National Metrology Institutes (NMIs); the United States' NMI is the National Institute of Standards and Technology (NIST). Each NMI is responsible for maintaining the primary standards, usually recognized by national law, that serve in its country as the basis for assigning values to other standards of the quantity concerned.

1.3 Regional Metrology Organizations (RMOs)

NIST is the U.S. member of the Inter-American Metrology System (SIM). All RMOs have as their objectives:

- Information exchange on measurement standards and capabilities
- Provision of international credibility for measurement traceability and competence as a basis for a global Mutual Recognition Arrangement (MRA) for metrology standards and calibration certificates issued by National Metrology Institutes
- Training of personnel to upgrade measurement capability within the region
- Facilitation of traceability of measurement through calibration and comparison of national standards, and
- Collaboration with BIPM, including the key comparison database, and also with other counterpart regional bodies.

Other RMOs with similar objectives include the:

- Asia Pacific Metrology Program (APMP)
- Euro-Asian Cooperation of National Metrological Institutions (COOMET)
- European Association of National Metrology Institutes (EURAMET), and the
- Southern African Community Cooperation in Measurement Traceability (SADCMET).

1.4 Accreditation

Accreditation of calibration and testing laboratories serves the objectives of the government and the private sector (industry, consumers, and other stakeholders) by fostering and promoting a uniformly acceptable base of professional and technical competence in the laboratory community, and facilitating and promoting acceptance of calibration and test results among countries to avoid barriers to trade. Testing and calibration laboratory accreditations underpin an infrastructure of competent measurement laboratories supporting domestic and international trade and conformity assessment activities. Accreditation programs provide an unbiased third-party evaluation and recognition of capability and performance, as well as expert technical guidance to upgrade laboratory performance.

1.4.1 International Accreditation Organizations

The International Laboratory Accreditation Cooperation (ILAC) has the aim of developing international cooperation for facilitating trade by promotion of the acceptance of accredited test and calibration results. ILAC membership is open to laboratory accreditation organizations that have been accepted as signatories to the ILAC Mutual Recognition Arrangement. Each accreditation body that is a signatory to the Arrangement agrees to abide by its terms and conditions and by the ILAC evaluation procedures. To do this, the signatory must:

- Maintain conformance with ISO/IEC 17011 Conformity assessment: General requirements for accreditation bodies accrediting conformity assessment bodies, related ILAC

[1] The U.S. Constitution provides that the Senate must advise and consent to ratification of treaties that have been negotiated and agreed to by the President. The formal process among nations in negotiating treaties gives treaty organizations their ability to commit nations to agreements. It also requires governmental representation in all deliberations and decision making.

guidance documents, and a few, but important, supplementary requirements;
- Ensure that all its accredited laboratories comply with ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories and related ILAC guidance documents.

These signatories have, in turn, been peer-reviewed and shown to meet ILAC's criteria for competence. The International Accreditation Forum, Inc. (IAF) is the world association of Conformity Assessment Accreditation Bodies and other bodies interested in conformity assessment in the fields of management systems, products, services, personnel and other similar programs of conformity assessment. The purpose of the IAF is to ensure that its accreditation body members accredit only competent bodies and to establish mutual recognition arrangements, known as Multilateral Recognition Arrangements (MLA), among its members. Accreditation body membership in IAF is open to organizations that accredit bodies for certification/registration of management systems, products, services, personnel or similar programs of conformity assessment.

1.4.2 Regional Laboratory Accreditation Organizations (RLAO's)

RLAO's that cooperate with members in their region and with ILAC and/or IAF to foster accreditation activities include:

- Asia Pacific Laboratory Accreditation Cooperation (APLAC)
- Central Asian Cooperation on Metrology Accreditation and Quality (CAC-MAS-Q)
- European Cooperation for Accreditation (EA)
- Inter-American Accreditation Cooperation (IAAC)
- Pacific Accreditation Cooperation (PAC), and
- Southern African Development Community in Accreditation (SADCA).

RLAO activities that support mutual recognition and acceptance of accredited services and results include: meetings for exchange of information and to promote discussion, such as common interpretation of standards; management of peer evaluations; organization of proficiency testing; development and promotion of mutual recognition arrangements among Members, and cooperation with other national, regional and international bodies with similar or complementary objectives. Accreditors domiciled in the United States seeking mutual recognition work through the APLAC.

2. Documentary Standards

2.1 The International Organization of Legal Metrology (OIML)

OIML is the international organization for developing documentary standards related to regulated and legally mandated measurements. OIML is an inter-governmental treaty organization established in 1955 by the "Convention" (the treaty), which has an objective of harmonization of national regulations and metrological controls (e.g., type approval, verification, etc) applied by legal metrology authorities. There are 59 Member States (voting) and 56 Corresponding Members (nonvoting). The oversight body of OIML is the International Committee of Legal Metrology (CIML), which meets annually. Each Member State has one CIML Member. A meeting of the OIML Conference is held every four years to establish general policy, vote on the budget and confirm the decisions of the CIML. The United States ratified the Convention and joined OIML in 1972.

The OIML utilizes Technical Committees (TCs) and Subcommittees (SCs) comprised of representatives from member countries to develop model regulations and standards. The standards are referred to in OIML as Recommendations. International consensus in the legal metrology community is reached through TC and SC activities. The composition of the TCs and SCs includes representatives from Member States and liaison representation from international standardization and technical organizations, manufacturers' associations and regional regulatory bodies. Under the coordination of a Secretariat, experts establish international technical guidelines for the metrological performance and testing procedures of measuring instruments subject to legal controls. The TCs are organized by general measurement discipline and the SCs are assigned specific types of measuring instruments or areas for standards development. During development, Recommendations go through successive incomplete drafts designated as 1 WD (Working Draft), 2 WD, etc. When a TC or SC addresses all necessary elements in a Recommendation the designation shifts from a WD to a Committee Draft (CD) with successive drafts numbered 1CD, 2 CD, etc. Following a successful TC or SC ballot and approval a CD is designated as a Draft Document (DD) or a Draft Recommendation (DR) and sent to the International Bureau of Legal Metrology (BIML) for approval by the CIML. The BIML provides the administrative, technical and editorial staffing function for the OIML. Following CIML approval, the BIML publishes and provides for free distribution of the Documents and Recommendations through the OIML website.

The OIML has developed a Certificate System for measuring instruments that comply with the Recommendations to promote global regulatory-body acceptance of test reports, thereby avoiding duplicative type evaluation testing requirements. Manufacturers may submit instruments to testing facilities authorized by national Issuing Authorities, which are designated by their CIML Members. The OIML web site database lists the Issuing Authorities and the OIML Certificates of Conformity (CC) submitted by the various national Issuing Authorities for registration by the BIML.

The OIML has developed a Mutual Acceptance Arrangement (MAA) that is related to the OIML Certification system used for Type Evaluations. The goal of the MAA is for the participants to accept and utilize Test Reports validated by an OIML MAA Certificate of Conformity. The scheme designates Participants in the MAA as either Issuing Participants (IPs) or Utilizing Participants (UPs). Issuing Authorities that will

issue and use OIML MAA Certificates of Conformity are designated as IPs. Tests reports associated with these OIML MAA Certificates will also be accepted and utilized by UPs to issue, for example, national type approvals. To foster confidence, the MAA includes an evaluation of the competence and testing capabilities of the Testing Laboratories of OIML Issuing Authorities applying to be an IP, according to the international standard ISO/IEC 17025 *General requirements for the competence of testing and calibration laboratories*. This evaluation may be carried out either by accreditation or by peer assessment. The Committee on Participation Review (CPR), comprised of experts from participating countries, studies the application files of potential participants and decides on the need to conduct peer assessments, considering the accreditation of the Testing Laboratories and the scope of these accreditations. Evaluation reports are distributed to the participants, and when all participants agree on the acceptability of the IP applicants, the IP applicants are allowed to sign the Declaration of Mutual Confidence (DoMC). The initial MAA implementation covers OIML R 60 (Load cells) and OIML R 76 (Nonautomatic weighing instruments), for which a large number of OIML Certificates have been issued. The first two Declarations of Mutual Confidence were published by the BIML in September 2006. The National Conference on Weights and Measures (NCWM) signed the DoMC (as a Utilizing Participant) for R60. Consequently, the U.S. National Type Evaluation Program (NTEP) will accept test data on load cells that are tested according to the requirements in OIML R60 (and additional, agreed-upon requirements), from Issuing Participants under the DoMC, to use as the basis of issuing NTEP Certificates. A DoMC for OIML R49 (Water meters) was begun in 2007.

2.2 Other International Standards Organizations

To avoid conflicting requirements for measuring instruments, the OIML establishes liaisons with international and regional institutions concerning activities in metrology, standardization and related fields including: the International Bureau of Weights and Measures (BIPM), the International Organization for Standardization (ISO), the International Electrotechnical Commission (IEC), the International Federation of Clinical Chemistry (IFCC), and the International Union of Pure and Applied Physics (IUPAP). The complete list is on the OIML liaison website. These organizations develop standards for related aspects of measuring instruments, such as safety; interoperability, and performance requirements not necessarily directly related to legal metrology.

2.3 Regional Legal Metrology Organizations (RLMOs)

The RLMOs provide a forum for sharing information on legal metrology in member countries and economies to promote a harmonized and consistent approach to legal metrology requirements in the region. RLMOs also facilitate communications and shared training opportunities. Shared specific objectives include supporting an integrated measurement infrastructure in the region, promoting equity in the market place, improving the quality of life and facilitating international trade.

For the United States, NIST is a member of both the Inter-American Metrology System - Legal Metrology Working Group (SIM -LMWG), and the Asia-Pacific Legal Metrology Forum (APLMF).

Other regional legal metrology organizations with similar roles include the:

- Euro-Asian Cooperation of National Metrological Institutions (COOMET)
- Euro-Mediterranean Legal Metrology Forum (EMLMF), and
- European Cooperation in Legal Metrology (WELMEC)

3. Laws and Regulations

National, state and local governments determine through the legislative process how to ensure that equity in the marketplace, and the safety and health of the public are maintained. Measurements play a crucial role and are tied to laws and regulations that govern the accuracy of measuring instruments and their conformity to national or recognized international specifications. Legal metrology involves not only the facilitation of traceability, but also means for detecting fraud (tampering), accidental misuse, and inaccuracy caused by influence factors which disrupt the measurement process. Instruments are controlled through a system of type approval, initial verification and marketplace surveillance.

4. Economic Promotion Organizations

Several global and regional organizations are focused on promoting international trade and fostering development necessary for free trade. An essential element for trade recognized by these organizations is legal metrology. The following organizations have supported developing such infrastructure in developing countries around the world.

The World Trade Organization (WTO) deals with the rules of trade among nations at a global or near-global level. It's an organization for liberalizing trade. It's a forum for governments to negotiate global trade agreements. It's a place for them to settle trade disputes. It operates on a system of rules covering global trade and associated aspects.

The Organization of American States (OAS) has dual roles in promoting development. On a political level, it fosters dialogue and consensus on ways to combat poverty and improve the level of development in the region. The OAS also mobilizes funds so member states can carry out projects in priority areas.

The United Nations Industrial Development Organization's (UNIDO) objective is to reduce poverty in countries with developing and transition economies through: sustainable

industrial growth with emphasis on productive economic activities; trade capacity building; and promotion of energy efficiency, renewable energy and environmental sustainability.

The World Bank is a vital source of financial and technical assistance to developing countries around the world to support its mission of reducing global poverty and improving living standards. The World Bank is made up of two unique development institutions owned by 185 member countries: the International Bank for Reconstruction and Development focuses on middle income and creditworthy poor countries, while the International Development Association focuses on the poorest countries in the world. Together they provide low-interest loans, interest-free credit and grants to developing countries for education, health, infrastructure, communications and many other purposes.

The United States Agency for International Development (USAID) is an independent U.S. federal government agency that receives overall foreign policy guidance from the Secretary of State. USAID supports long-term economic growth, agriculture and trade in countries recovering from disaster, trying to escape poverty and engaging in democratic reforms.

GLOSSARY OF ACRONYNMS

(Acronyms with underscores are cross-linked to web sites and only available in electronic version of this document.)

APLAC	Asia Pacific Laboratory Accreditation Cooperation
APLMF	Asia-Pacific Legal Metrology Forum
APMP	Asia Pacific Metrology Program
BIML	International Bureau of Legal Metrology
BIPM	International Bureau of Weights and Measures
CAC-MAS-Q	Central Asian Cooperation on Metrology Accreditation and Quality
CC	Certificate of Conformity
CD	Committee Draft
CGPM	General Conference on Weights and Measures
CIPM	International Committee for Weights and Measures
COOMET	Euro-Asian Cooperation of National Metrological Institutions
CPR	Committee on Participation Review
DD	Draft Document
DoMC	Declaration of Mutual Confidence
DR	Draft Recommendation
EA	European Cooperation for Accreditation
EMLMF	Euro-Mediterranean Legal Metrology Forum
EUROMET	European Collaboration in Measurement Standards
IAAC	Inter-American Accreditation Cooperation
IAF	International Accreditation Forum
IEC	International Electrotechnical Commission
IFCC	International Federation of Clinical Chemistry
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organization for Standardization
IUPAP	International Union of Pure and Applied Physics
MAA	Mutual Acceptance Arrangement
MLA	Multilateral Recognition Arrangements
MRA	Mutual Recognition Arrangement
NCWM	National Conference on Weights and Measures
NIST	National Institute of Standards and Technology
NMIs	National Metrology Institutes
NTEP	National Type Evaluation Program
OAS	Organization of American States
OIML	International Organization of Legal Metrology
PAC	Pacific Accreditation Cooperation
R	Recommendation
RLAOs	Regional Laboratory Accreditation Organizations
RLMOs	Regional Legal Metrology Organizations
RMOs	Regional Metrology Organizations
SADCA	Southern African Development Community in Accreditation
SADCMEL	Southern African Community Cooperation in Measurement Traceability
SC	Technical Subcommittee
SI	International System of Units
SIM	Inter-American Metrology System
SIM-LMWG	Inter-American Metrology System - Legal Metrology Working Group
TC	Technical Committee
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WD	Working Draft
WELMEC	European Cooperation in Legal Metrology
WTO	World Trade Organization

PLAN TO ATTEND . . . The National Conference on Weights and Measures 93rd Annual Meeting

July 13 - 17, 2008, in Burlington, Vermont - See: http://www.ncwm.net for more information.

Educational Services

Training Class

Examination Procedure Outline for Price Verification

"Training at NIST in September"

By David Sefcik

Recently, there has been renewed interest in the Examination Procedure Outline (EPO) for Price Verification in Handbook 130, *Uniform Laws and Regulations in the area of legal metrology and engine fuel quality*. NIST has held two classes this year with a third class scheduled for September. Past participants have come from the weights and measures sector and industry.

As one state Director commented after training, "The history, evolvement, and especially the hands on training really brought the EPO to life." In a class that involved both industry and state inspectors, several of the retail participants remarked, "We really enjoyed the interaction and open discussion with Weights and Measures officials."

Two months after his staff was trained on the EPO, I asked the state Director how the price verification inspections were going. He responded, "As we started using the procedures, I was surprised at the number and the high dollar value of the pricing errors we were finding. To our amazement, one store had 36 % accuracy. Obviously, this has led to greater enforcement action on our part."

The EPO for price verification was adopted by the National Conference on Weights and Measures (NCWM) at its 80th Annual Meeting in July 1995. Hard to believe it's been 13 years! The EPO was developed to provide uniformity in the method of inspection procedures used by states, and provides inspection test procedures, suggested enforcement practices, and other tools necessary to monitor and evaluate the pricing practices of retail stores. All states are encouraged to adopt the EPO for use in their state program.

Industry uses the EPO as a cost effective and practical approach to ensure compliance in their stores. Price verification inspections conducted by weights and measures inspectors and retailers helps to ensure that consumers are charged the correct price for items they purchase, and that good pricing practices exist to achieve ongoing accuracy and integrity.

The price verification procedures work in any type of store format. They can be used to conduct inspections in supermarkets, department stores, hardware, discount, drug, club, warehouse, automotive, pet, convenience, and even catalog stores. They can also be used in any type of retail pricing system including scanning, price look up codes, and price marking.

The next NIST EPO training class is scheduled for September 24 - 25, 2008, at the NIST campus in Gaithersburg, Maryland. Although you will need to cover your travel expenses, registration is free. This is a two-day course with a class size limit of 10 people. Please reserve your spot soon.

Training will be comprised of the history and background of the EPO, a detailed review of the examination procedures directly out of Handbook 130, "Uniform Laws and Regulations in the areas of legal metrology and engine fuel quality," a case study of one state's enforcement procedures, and hands-on training at actual retail sites.

If you would like more information about the price verification EPO or would like to sign up for the class in September, please contact me, David Sefcik, 301-975-4868, or e-mail dsefcik@nist.gov.

National Propane Gas Association

SAFETY ALERT

Anhydrous Ammonia and Propane Cylinders

INTRODUCTION: Readers of this bulletin should consult the law of their individual jurisdictions for codes, standards and legal requirements applicable to them. This bulletin merely suggests methods which the reader may find useful in implementing applicable codes, standards and legal requirements. This material is not intended nor should it be construed (1) to set forth procedures which are the general custom or practice in the propane industry; (2) to establish the legal standards of care owed by propane distributors to their customers; or (3) to prevent the reader from using different methods to implement applicable codes, standards or legal requirements. The National Propane Gas Association assumes no liability for reliance on the contents of this bulletin. It is offered as a guide only to assist expert and experienced teachers and managers in training in service personnel in their organizations.

Caution!

The brass valve in a propane cylinder will be damaged if it comes in contact with anhydrous ammonia. This deterioration will lead to cracking of the valve body or its components and can ultimately result in a violent, unexpected expulsion of the valve from the cylinder, causing personal injury or death.

Background and Recommended Action

It has come to the attention of the National Propane Gas Association that propane cylinders are being used in the manufacturing of Methamphetamines. This drug is commonly referred to as 'crank'. Manufacturers of this illegal substance are using propane cylinders for the storage and the use of anhydrous ammonia. These cylinders have been found in many states at cylinder exchange and refilling locations as well as in hotel rooms and mobile laboratories, where the manufacturing of this illegal substance takes place.

As observed in the illustrations, a blue-green stain on any brass portion of a service valve is evidence that it may have been in contact with anhydrous ammonia*. The pungent odor of ammonia on or near the cylinder is also an indication. If you suspect that a propane cylinder contains or has contained anhydrous ammonia, exercise extreme caution and restrict access to the area.

It can be dangerous to move the cylinder due to the unknown integrity of the cylinder's service valve. If you determine that it must be moved, keep in mind that hazards due to valve expulsion can be reduced by pointing the end of the container in which the valve is placed away from yourself and others and towards the most safe direction.

Immediately contact your Fire Department, Hazardous Materials Emergency Response Unit or the nearest office of the United States Department of Justice's Drug Enforcement Administration (DEA) for information on properly disposing of the cylinder. If these respondents are not sure what to do, for assistance call **1-800-728-2482**, which is the contact number for PERS, an independent hazardous materials information resource.

***Note:** Sherwood valves contain a green coated valve stem. Additionally, a green thread sealing compound is used on some valves. These valves should not be confused with those that have been exposed to anhydrous ammonia.

Valve stem damaged by anhydrous ammonia.

Sherwood valve that contains a green coated valve stem.

Pictures courtesy of the National Propane Gas Association
Article is from the National Propane Gas Association at www.npga.org.

Calendar of Events

2008

JULY 2008
7 – 11
Laboratory Administration Workshop
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

13 – 17
NCWM 93rd Annual Meeting
Sheraton Burlington Hotel & Conference Center
Burlington, VT
Contact: NCWM, 240-632-9454 or http://www.ncwm.net

14 – 18
Retail Computing Scales Training
OH Department of Agriculture/W&M Lab (tentative)
Reynoldsburg, OH
Contact: Ken Wheeler, 614-728-6290 or
KWheeler@agri.ohio.gov

AUGUST 2008
2
Scale & Balance Calibration & Uncertainty
NCSLI
Walt Disney World Swan & Dolphin
Orlando, FL
Contact: NCSLI, 303-440-3339 or www.ncsli.org

3 – 7
NCSL International Workshop & Symposium
Walt Disney World Swan & Dolphin
Orlando, FL
Contact: NCSLI, 303-440-3339 or www.ncsli.org

18 – 22
OH Regional Training Seminar
NIST HB 133, Checking the Net Contents of Packaged Goods
Athens, OH
Contact: Ken Wheeler, 614-728-6290 or
KWheeler@agri.ohio.gov

PLEASE NOTE

Future editions of the *Weights & Measures Quarterly* will be distributed only by e-mail and available online from the NIST Weights and Measures webpage at: http://www.nist.gov/owm. To update your contact information, e-mail WMD at owm@nist.gov or call (301) 975-4004.

SEPTEMBER 2008

7 – 11
Western Weights & Measures Association (WWMA) Annual Meeting
Anchorage Marriott Downtown
Anchorage, AK
Contact: Doug Deiman, 907-365-1238 or doug.deiman@alaska.gov

14 - 17
Central Weights & Measures Association (CWMA) Interim Meeting
Holiday Inn Rock Island Hotel & Conference Center
Rock Island, IL
Contact: Steve Gill, 573-751-4278 or steve.gill@mda.mo.gov

15 – 19
SWAP (Regional Members only)
Little Rock, AR
Contact: Ray Curtis, 501-570-1159 or Ray.Curtis@aspb.ar.gov

22 – 26
NEMAP (Regional Members only)
Avenel, NJ
Contact: Ray Szpond, 732-815-4840 or
szpond@dca.lps.state.nj.us

24 – 25
EPO for Price Verification
NIST
Gaithersburg, MD
Contact: David Sefcik, 301-975-4868 or dsefcik@nist.gov

29 – October 3
OH Regional Training Seminar
NIST HB 133, Checking the Net Contents of Packaged Goods
Findlay, OH
Contact: Ken Wheeler, 614-728-6290 or
KWheeler@agri.ohio.gov

OCTOBER 2008
5 – 8
Southern Weights & Measures Association (SWMA) Annual Meeting
Doubletree Hotel Atlanta Airport
Atlanta, GA
Contact: Marvin Pound, 404-656-3719 or
mpound@agr.state.ga.us

6 – 10
MidMAP (Regional Members only)
Bismark, ND
Contact: Kevin Hanson, 701-328-3337 or kjhanson@nd.gov

6 – 10
OH Regional Training Seminar
NIST HB 133, Checking the Net Contents of Packaged Goods
Wilmington, OH
Contact: Ken Wheeler, 614-728-6290 or
KWheeler@agri.ohio.gov

18 – 22
NCSLI Board Meeting
Gatlinburg, TN
Contact: NCSLI, 303-440-3339 or www.ncsli.org

22 – 24
Asia Pacific Legal Metrology Forum Meeting
Sydney, Australia
Contact: Chuck Ehrlich at 301-975-4834 or
charles.ehrlich@nist.gov

27 – 31
13th OIML Conference and 43rd CIML Meeting
Sydney, Australia
Contact: Chuck Ehrlich at 301-975-4834 or
charles.ehrlich@nist.gov

NOVEMBER 2008
3 – 7
Basic Mass for Industry
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

12 – 14
Scale Manufacturers Association (SMA) Fall Meeting
Big Cedar Lodge
Ridgedale, Missouri
Contact: Phil Hannigan, 239-514-3441x12 or
phil@scalemanufacturers.org

17 – 21
OH Regional Training Seminar
NIST HB 133, Checking the Net Contents of Packaged Goods
Akron, OH
Contact: Ken Wheeler, 614-728-6290 or
KWheeler@agri.ohio.gov

DECEMBER 2008
1 – 5
OH Regional Training Seminar
NIST HB 133, Checking the Net Contents of Packaged Goods
Reynoldsburg, OH
Contact: Ken Wheeler, 614-728-6290 or
KWheeler@agri.ohio.gov

8 – 12
Intermediate Metrology
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

2009

JANUARY 2009
11 – 14
NCWM 94th Interim Meeting
Daytona Beach, FL
Contact: NCWM, 240-632-9454 or www.ncwm.net

FEBRUARY 2009
2 – 6
Advanced Mass Seminar
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

9 – 13
Advanced Mass Hands-On
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

MARCH 2009
16 – 27
Basic Metrology – States
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

23 – 24
MSC Mass Short Course
Anaheim, CA
Contact: 866-672-6327 or http://www.msc-conf.com

25 – 27
Measurement Science Conference (MSC)
Anaheim, CA
Contact: 866-672-6327 or http://www.msc-conf.com

APRIL 2009
19 – 24
Combined Regional Measurement Assurance Program (C-RMAP)
Concord, CA
Contact: Georgia Harris, 301-975-4014 or gharris@nist.gov

MAY 2009
4 – 8
Basic Mass for Industry
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

JULY 2009
12 – 16
NCWM 94th Annual Meeting
San Antonio, TX

26 – 30
NCSL International Workshop & Symposium
San Antonio Convention Center
San Antonio, TX
Contact: NCSLI, 303-440-3339 or https://www.ncsli.org

OCTOBER 2009
26 – 30
Basic Mass for Industry
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

NOVEMBER 2009
2 – 6
Intermediate Metrology
NIST, Gaithersburg, MD
Contact: Val Miller, 301-975-3602 or val.miller@nist.gov
Applications at: http://www.nist.gov/labmetrology

For meetings and events for the **American Petroleum Institute (API)**, please check the API website at www.api.org and click on the Meetings and Training Section under the "Energy Professional Site" bullet on the left-hand portion of the home page. Information for **American Society for Testing and Materials (ASTM)** meetings is available at www.astm.org on their Internet website. Click on the "Meetings" bullet on the left-hand portion of the home page. These meetings and seminars are updated on a continuous basis. For information regarding **American National Standards Institute (ANSI)**, click on the "Meetings and Events" bullet on their web-site at www.ansi.org. For information regarding the National Conference on Weights and Measures (NCWM), please check the NCWM website at www.ncwm.net.

If you want your meeting, conference or training session included in the Calendar of Events, please contact WMD at 301-975-4004 or owm@nist.gov.